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Physical Sciences Section

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SYNTHESIS AND CARDIOVASCULAR ACTIVITY OF NEW PHENOTHIAZINES

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(Received May 29, 1993)

Some new Schiff's bases substituted-benzaldehyde, 2-(2-acetyl-10H-phenothiazin-10-yl)-2-oxo-ethyl hydrazones (IVa-IVe), 2-acetyl-10-(5-substituted phenyl-2-oxo-4-thiazolidin-1-yl)-aminoacetylphenothiazines (Va-Ve), 2-acetyl-10-[(2-oxo-3-chloro-4-azetidin-1-yl) aminoacetylphenothiazines (VIa-VIc) and 1, 3-disubstituted phenyl-5-[(2-acetyl-10-phenothiazin-10-yl)-2-oxo-ethyl] formazans (VIIa-VIIb) have been synthesized and were evaluated for their cardiovascular activity. Compounds IVa, IVd and IVe showed highly statistically significant changes in blood pressure, heart rate and pressor responses (Cardiovascular activity). **The most active compound** in our preliminary study is found to be 2, 4-dichlorobenzaldehyde 2-(2-acetyl-10H-phenothiazin-10-yl)-2-oxo-ethyl hydrazone (IVa) which showed statistically significant changes in the fall of blood pressure (75.63%).

Key words: Phenothiazine derivatives, Cardiovascular activity, Toxicity studies.

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SYNTHESIS OF SOME QUINOXALINE-6-MORPHOLYL SULPHONAMIDE DERIVATIVES

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(Received June 7, 1993)

Condensation of (III) with amines furnished (IV_{a-c} and V_{a,b}), while interaction of (III) with sulphanilamide in the presence of anhydrous potassium carbonate yielded (VI). Treatment of (III) with thiourea caused cyclization and gave (IX_{a,b} and X). Cyclization reaction of (III) with acetonethiosemicarbazone furnished (XI). The reaction of the free base (XII) with carbon disulphide afforded (XVI), which reacted with hydrazine hydrate to give (XVIII). Cyclization of (XVIII) with benzoyl chloride furnished the triazolo-derivative (XIX).

Key words: Quinoxalines-6-Morpholyl, Sulphonamide, Application to pharmacological agents.

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PREPARATION OF AN ACTIVE FOAMING/WHIPPING AGENT FROM SOYBEAN MEAL

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(Received June 20, 1993)

Foaming/whipping agent has been prepared from soybean meal using different proteolytic enzymes i.e. Alcalase, Neutrase, Papain and Pepsin. Optimum conditions such as time, temperature, pH of the reaction mixture have been worked out. The foaming agent prepared by the treatment of Pepsin on soybean meal possesses maximum whipping expansion and foam stability. The product is in powder form and possesses a good storage life upto two years.

Key words: Foaming/whipping agent, Soybean meal.

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SYNTHESIS OF SOME NEW PYRAZOLINES FROM 4-AMINO-4-METHOXYBENZALACETOPHENONE AS DYESTUFFS INTERMEDIATES

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(Received January 8, 1995)

New aminopyrazoline derivatives (II-V) has been obtained by the reaction of new benzalacetophenone derivatives (Ia, b) with hydrazine hydrate and their derivatives. Further reactions were carried out on pyrazolines (VI-XI). The structural determination of the prepared compounds has been confirmed using elemental analysis, chemical reactions and spectral data.

Key words. P-aminoacetophenone, Pyrazoline derivatives, Pyrazole derivatives.

CHEMICAL KINETIC MODELLING STUDIES
Part-I. The Reaction of Hydrogen Chloride with DI-Tertiary Butyl Peroxide

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(Received June 5, 1993)

The chemical kinetic modelling studies of the reaction of three torr of hydrogen chloride and one torr of di-*t*-butyl peroxide (dtBP) mixture was carried out, at 383°K, over a reaction time of 0-2500 seconds. The "Gear" programme was used to model this study. This modelling system assisted in choosing the reaction steps for a probable mechanism and in the assessment of rate parameters for individual steps in reaction mechanism.

Key words: Kinetic, Elementary rates, Modelling studies.

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COLORIMETRIC DETERMINATION OF MEFLOQUINE IN BIOLOGICAL FLUIDS AND PHARMACEUTICAL DOSAGE FORMS

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A rapid, accurate and simple colorimetric method is proposed for the determination of mefloquine in biological fluids and pharmaceutical dosage forms. The green complex (soluble in nitrobenzene) formed between mefloquine and cobalt/thiocyanate reagent has absorption maximum at 625nm. The percentage recoveries of 98-101% obtained in urine, plasma and serum and the limit of sensitivity of 0.1 ug/ml showed that the method is applicable to the determination of mefloquine in these biological fluids. The method also gave a percentage label strength of 98% for formulated mefloquine tablets and capsules.

Key words: Mefloquine, Biological fluid, Tablets and capsules.

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EXTRACTION OF ALUMINA FROM NEPHELLINE SYENITE BY SINTERING WITH LIMESTONE

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(Received October 18, 1995)

Nepheline Syenite of Koga (Lower Swat area) Pakistan was sintered at 125°C with suitable quantity of limestone followed by water leaching for the formation of alkali aluminates which are further processed for the extraction of alumina. Parameters such as particle size variation, ratio of nepheline syenite and limestone, time temperature of sintering and sodium hydroxide concentration were optimized to obtain maximum recovery of alumina. The extraction of alumina on the basis of alumina in Nepheline syenite has been found to be about 70%. Such a process may be of vital importance to countries without ready access to supplies of alumina in the form of bauxite.

Key words: Extraction, Alumina, Nepheline syenite, Sintering with lime stone.

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ACIDITY CONSTANT OF BENZALDEHYDE -2- HYDROXY AZINE AND ITS CHELATION WITH Cu (II), Co (II) AND Ni (II)

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(Received January 25, 1996)

The acid dissociation constant of benzaldehyde-2-hydroxyazine (H_2A) is determined spectrophotometrically in a series of universal buffer solutions (20% ethanol, v/v) of varying pH. Cu (II), Co (II) and Ni (II) omplexes of H_2A have been prepared and characterized by elemental analysis, molar conductance, electronic and infrared spectra measurements. It is concluded that the ligand acts as bivalent ONNO tetradentate. The complexes are suggested to exhibit a distorted octahedral geometry.

Key words: Schiff base, Complexes of benzaldehyde-2-hydroxy azine, Acidity constant.

Biological Sciences Section

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EFFICACY OF IVERMECTIN AGAINST SARCOPTIC MANGE IN CAMEL

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(Received August 22, 1992)

Ivermectin at the dose rate of 0.2 mg/kg body weight and 0.4 mg/kg body weight as subcutaneous injection repeated 3 times at 15 days interval proved to be 100% effective against light, medium and heavy infestation of sarcoptic mange in camels. No side effects were observed with this drug. The untreated control animals remained positive for mange throughout the course of treatment.

Key words: Ivermectin (Ivomec), Mange, Camel.

INFLUENCE OF TWO SEWAGE SLUDGE SOURCE ON PLANT GROWTH AND NUTRIENTS UPTAKE

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(Received January 14, 1993)

The effect of dried sewage sludge from two sources (Suez and Giza governorates) on faba bean growing on sandy soil followed by sorghum to test the residual effect of the sludge on its growth and mineral content was studied in a pot experiment. The results showed that, for faba bean, the number of nodules/plant, plant height and leaf area increased significantly due to application of either Suez or Giza sludge up to 5%. The former sludge increased the yield not up to 5% while the latter gave only 2.5% increase. Data also revealed that shoot and root dry weights of sorghum plants significantly increased by Suez and Giza sludge by 7.5 and 5% respectively. The higher rate (10%) of Giza sludge inhibited root growth. Nitrogen and P contents increased by either sludge application. Zn and Cu contents of roots and shoots increased by increasing the rate of Suez sludge, while Fe, Mn, Ni and Cr contents of roots were slightly affected and they remained unchanged in the shoots. Giza sludge applications caused progressive increase in most of heavy metals in sorghum plants specially Cr. According to the Zn equivalent, the maximum rate of dried sludge to be added to the soil is 78.13 tons/fed for Giza sludge and 160.25 tons/fed for Suez sludge before the safe limits are exceeded. The addition may be divided over long period.

Key words: Sewage sludge, Plant growth, Nutrients.

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TOXICOLOGICAL STUDIES OF HERBAL BEVERAGE AND SEEDS EXTRACT OF *HIBISCUS SABDARIFFA* L. (ROSELLE)

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(Received February 16, 1994)

Toxicological effects of herbal drink prepared from exotic plant, *Hibiscus sabdariffa* L. (Roselle) were studied on albino mice and rats. For this purpose different doses of the drink were administered orally to different groups of test animals which were kept under observation for a period of three months. The roselle seeds extract was also administered by the same method and tested on the animals. After autopsy, the histopathological examination of liver and kidneys of the treated animals showed on cytotoxic effects.

Key words: *Hibiscus sabdariffa* L., Herbal beverage, Toxicology.

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ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS. *Part II*

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(Received September 14, 1994)

Antifungal activity of the essential oils was studied against the strains of *Aspergillus niger*, *A. parasiticus*, *A. flavus*, *A. oryzae*, *A. fumigatus*, *Penicillium digitatum*, *Trichoderma* Spp. and *Helminthosporium oryzae* by zone inhibition method. These oils were also tested for their fungicidal/fungistatic activity. Variable toxicity was observed against one or more of the test fungi. The essential oil of seed and gum portion of *Ferulassafoetida* exhibited antifungal activity against all of the 8 test fungi.

Key words: Antifungal activity, Oils, Inhibition zone, Fungicidal/fungistatic activity.

RELATIONSHIP BETWEEN SEEDLING AND MATURE PLANT TRAITS RELATED TO STRESS TOLERANCE OF WHEAT

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(Received September 19, 1994)

Studies were conducted on twenty five spring wheat varieties/lines in the greenhouse and the field, using completely randomized design and randomized complete block design, respectively. In the greenhouse soil water content and atmospheric relative humidity were controlled to achieve the following treatments:- 1) unstressed, 2) root stress, 3) aerial stress and 4) root plus aerial stress. In the field experiment the crop was grown under naturally occurring stress (about 50 mm of rain in crop season). Data were recorded on various seedling and mature plant traits to determine the extent of genetic variability among genotypes and interrelationships between the traits. The differences among the varieties/lines were highly significant for all the traits. Almost all the values of genotypic correlations were greater than phenotypic ones. In the least and most stressed treatments survival rate, flag leaf area, number of stomata and leaf venation were positively and significantly correlated with grain yield. In the root stress treatment survival rate, root volume, root-shoot ratio, hygrophilic colloids, epidermal cell size and osmotic pressure were negatively but non-significantly correlated with grain yield. Maximum and significant genotypic correlation (0.79) was found between survival rate at root + aerial stress and number of stomata followed by 0.57 between root volume and hygrophilic colloids. Path coefficient analysis showed that leaf venation had the maximum (0.73) direct association with grain yield followed by survival rate at no water stress (0.42). Epidermal cell size had maximum indirect effect on grain yield through leaf venation.

Key words: *Triticum aestivum*, Correlation, Path-coefficient analysis.

EFFECT OF NITROGEN AND PLANT SPACING ON GROWTH, GREEN FODDER YIELD AND QUALITY OF MOTT ELEPHANT GRASS (*Pennisetum purpureum* Schum.)

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(Received September 22, 1994)

Effect of varying levels of nitrogen and plant spacing on growth and green fodder yield of Mott elephant grass (*Pennisetum purpureum* Schum.) was studied under field conditions at Faisalabad. Experimental treatments comprised nitrogen levels, viz., 0, 100 and 200 kg N ha⁻¹ and plant spacing, viz., 45 x 45, 60 x 60, 75 x 75 and 90 x 90 cm. Experiment was laid out in a split plot design. In all cuttings, application of nitrogen significantly increased plant height, number of tillers stool⁻¹, fresh weight stool⁻¹, crop growth rate and green fodder yield ha⁻¹ over control. Similarly an increase in plant spacing significantly increased number of tillers stool⁻¹, fresh weight stool⁻¹ and crop growth rate, but it caused a significant reduction in green fodder yield. On the basis of three-cutting average data, crop grown at 45 x 45 cm and fertilized @ 200 kg N ha⁻¹ gave significantly maximum green fodder yield (90.88 t ha⁻¹) per cutting while crop raised at 90 x 90 cm and without N fertilization produced minimum green fodder yield (37.21 t ha⁻¹)

Key words: Mott elephant grass, Nitrogen Levels, Plant spacing, Plant development, Green fodder yield.

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EFFECT OF DIFFERENT DOMESTIC PROCESSING AND COOKING METHODS ON THE TANNIN CONTENTS OF LENTILS (*LENS ESCULENTA*)

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(Received October 9, 1994)

Significant reduction in tannin contents was observed after soaking the lentils in simple water or salt solutions of different concentrations. Soaking in sodium bicarbonate solution was the most effective way to reduce the tannin content. Cooking lentils also further reduced tannin and improved protein digestibility.

Key words: Lentils, Tannins, Reduction.

REPLACEMENT OF COSTLY FISH MEAL BY SILKWORM PUPAE IN DIET OF MIRROR CARP (*CYPRINUS CARPIO* L.)

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(Received December 26, 1994)

Four isonitrogenous (38% protein) diets were prepared using fish meal, silkworm pupae (*Bombyx mori*), mustard oil cake (*Brassica juncea*) and maskali bran (*Phaseolus mungo*) as dietary protein sources. Silkworm pupae (SWP) was included in the diets at 40, 30 and 20% of dietary level of protein in the diet 2, 3 and 4 respectively. The dietary protein from mustard oil cake and maskali bran were kept constant. These diets were tested in cistern tank for 77 days to evaluate the low-cost silkworm pupae meal in the diet of mirror carp (*Cyprinus carpio* L.) and growth response of fish fed these diets were compared to fish fed a fish meal based control diet (diet 1). Diet 2 and 3 showed significantly ($P < 0.05$) higher growth performance followed by diet 4. The control diet without silkworm showed poorest growth performance. Body lipid and protein content of fish were found to increase in fish fed higher levels of SWP based diets. The results of the study indicate the possibility of replacing the costly fish meal with silkworm pupae in formulating low-cost diet for mirror carp.

Key words: Fish meal, Silkworm pupae, Diet of mirror carp.

Technology Section

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MANUFACTURE OF EXOTIC FRUIT-FLAVOURED MILK BEVERAGE BY EMPLOYING UHT TECHNIQUE

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Milk-shakes especially containing apple are popular beverage of the summer season in Pakistan. Pineapple-flavoured apple milk-based beverages were prepared by using different doses of four stabilizers and varying SMP contents. After one day's cold storage, 16 formulations thus prepared were organoleptically evaluated by a trained panel of judges to select the best beverage. Recodan and Supercol applied @ 0.2-0.3% gave inferior-quality beverages, while Grindsted's Gelodan and Givaudan's stabilizer No. 76084-72 gave acceptable beverages. The best formulation was prepared by using 13% cane-sugar, 3% apple pulp, 2% SMP, 0.3% Givaudan's stabilizer, 0.2% citric acid, 0.02% sodium citrate, 0.01% potassium sorbate, 0.07% pineapple flavour, colour as desired and made volume to 100% with water. This was manufactured on a UHT plant by direct steam-injection technique at 144°C and packed in 250 ml brick packs. The results of the triangular taste test showed that the product was admired by the panelists and it remained good up to 75 days' storage in ambient and 90 days' refrigerated storage.

Key words: Milk-based fruit beverages, Apple milk shakes, UHT technique.

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ACHIEVEMENTS IN BENEFICIATION AND PROCESSING OF LOW GRADE GRAPHITE DEPOSITS, EGYPT

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(Received April 3, 1995)

Beneficiation of low graphite deposits sampled for Barramiya, Bent Abu Garriya and Wadi Sitra was carried out through systematic flotation experiments using a mixture of (2-ethyl hexanol and hydrocarbon oil) as a collector in addition to several cationic and anionic co-collectors added to the collector mixture to improve flotation rate. It appears that flotation rate could be increased when ethoxylated sulfonate used as anionic co-collector as well as when the selectivity of graphite concentrate is increased. Processing of graphite concentrate which was carried out through roasting with sodium hydroxide and leaching with hydrochloric acid led to production of concentrate analyzing 92% fixed carbon which meets the raw material standard for the manufacture of carbon electrode and electrochemical cells.

Key words. Beneficiation, Processing, Low grade graphite.

Short Comm

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Removal of Iron and Manganese from Under-ground Water Using Cement Dust

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Seasonal Variations in the Composition of Essential Oil of *Eucalyptus citriodora* of Pakistan

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Special Article

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PARTICIPATIVE TRANSFER OF TECHNOLOGY: MEETING THE EMERGING CHALLENGE OF R&D COMMERCIALIZATION IN PAKISTAN

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Summary

Restrictive public sector funding to R&D with the expectation of greater participative investment by the end users has led to the